

POLYTRICHAPHIS (HOMOPTERA: APHIDIDAE), A NEWLY RECORDED GENUS FROM CHINA, AND DESCRIPTION OF A NEW SPECIES

GEXIA QIAO AND GUANGXUE ZHANG

Institute of Zoology, the Chinese Academy of Sciences,
Beijing 100080 P. R. China

Abstract.—The aphid genus, *Polytrichaphis* Miyazaki, is newly recorded from China. A new species, *Polytrichaphis illicius* Qiao and Zhang, is described. The type is deposited in the Zoological Museum, Institute of Zoology, the Chinese Academy of Sciences, Beijing, China.

Key Words.—Insecta, Aphididae, Macrosiphinae, *Polytrichaphis*, New Species, New Record, China.

Some aphids infesting *Illicium verum* on young leaves of the tree were collected in Beiliu County, Guangxi Autonomous Region, P.R. China. Blackman and Eastop (1984, 1994) listed no aphids on *Illicium verum*. Miyazaki (1971) described one new genus, *Polytrichaphis* collected from *Illicium anisatum* in Japan, which belongs to the member of Macrosiphinae. Careful examination revealed that the present specimens belong to a new species, *Polytrichaphis illicius*. Because the tree, *Illicium verum* is economically important in Guangxi Autonomous Region, biological studies on the aphid will have important effects on agricultural production of the tree.

To morphological characters, the genus *Polytrichaphis* Miyazaki is originally described in the Macrosiphini because of the absence of lateral abdominal tubercles and the presence of moderately developed antennal tubercles (Miyazaki 1971, Remaudière & Remaudière 1997). However, Eastop (1979) thought that the genus may even belong to the subtribe Aphidina but it seems more useful to include than to exclude it. Therefore, regarding the systematic status of *Polytrichaphis* much work needs to be done in the future. In this paper, the genus will be regarded as a member of Macrosiphinae, because the distance between stigmal pori on 2nd and 3rd abdominal segments is at least 3.10 times as long as the distance between stigmal pori on 1st and 2nd abdominal segments (Eastop 1979).

The specimens were collected from Guangxi Autonomous Region (Beiliu City 130 m) by Jinyi Huang. All specimens were deposited in the Zoological Museum, Institute of Zoology, the Chinese Academy of Sciences, Beijing, China.

The terminologies and descriptions follow that of Miyazaki (1971). The unit of measurements is in millimeters (mm).

POLYTRICHAPHIS MIYAZAKI, 1971 NEW RECORD IN CHINA

Polytrichaphis Miyazaki, 1971, Ins. Mats., 34(2): 166.

Polytrichaphis Miyazaki: Eastop VF, 1979, Syst. Ent. 4: 386; Remaudière G and M Remaudière, 1997, Catalogue of the world's Aphididae. Homoptera: Aphidoidea, 139.

Type Species.—*Polytrichaphis fragilis* Miyazaki, 1971, by original description.

Diagnosis.—Body oval or elliptical. Median front slightly developed; frontal

tubercles distinct, Antenna 6-segmented, longer than body; without secondary rhinaria in apterous viviparous female; in alate viviparous females with round, variable in size secondary rhinaria on 3rd–5th segments. Mesosternal furca with arms separated from each other. All first tarsal segments bearing 2 setae which are much removed from apex of the segment. Media vein of fore wing 2-branched, hind wing with two oblique veins; wing veins bordered with black bands. Siphunculus sub-cylindrical, weakly imbricated, with slightly spinulose shorter stripes and distinct flange at apex. Cauda elongated tongue-shaped, non-constricted.

Host Plants.—Aphids in this genus feed on plants in the Illiciaceae.

Distribution.—China, Japan.

The genus is represented by two species as follow: *Polytrichaphis fragilis* Miyazaki, and new species *P. illicius* Qiao and Zhang. The genus is newly recorded in China, and there is one new species described from China in this genus.

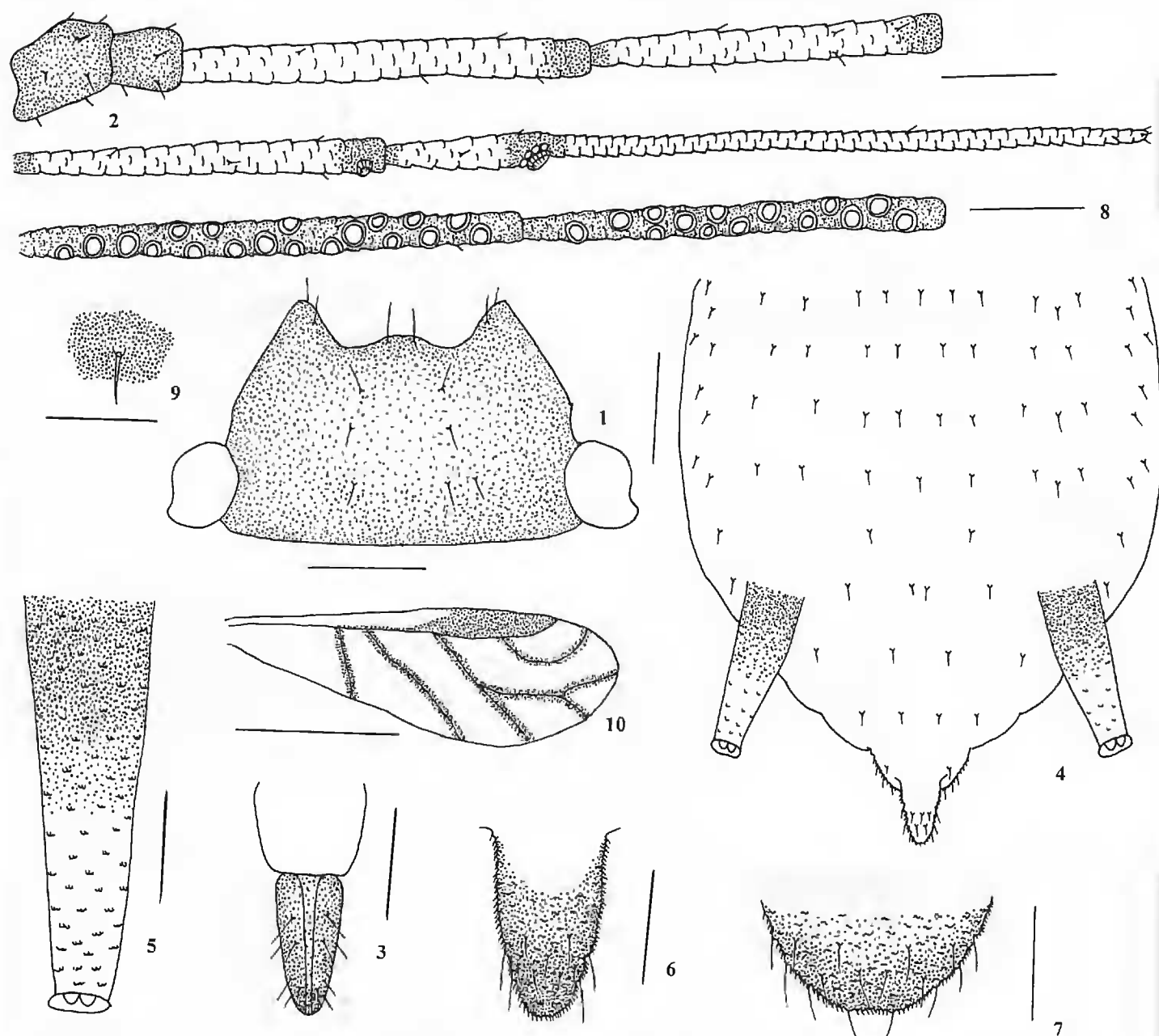
POLYTRICHAPHIS ILLICIUS, NEW SPECIES

(Figs. 1–10)

Types.—Holotype, apterous viviparous female (Figs. 1–7), deposited in Zoological Museum, Institute of Zoology, the Chinese Academy of Sciences, P.R. China, data: CHINA, GUANGXI AUTONOMOUS REGION, BEILIU Co.: 110.3° E, 22.7° N, 130 m, 27 Mar 1997, on *Illicium verum*, by Jinyi Huang (No. Y8243-1-5-2); paratypes: 14 apterous viviparous females and 18 alate viviparous females, other data same as holotype.

Description of Apterous Viviparous Females.—Body oval, black in life, 1.63–1.81 mm long, 0.93–1.13 mm wide. In mounted specimens: distal of 3rd antennal segment, tip and base of 4th–5th segments, basal of 6th segment darkly brown; basal $\frac{1}{2}$ – $\frac{1}{3}$ of siphunculi darkly brown, others pale brown.

Frontal tubercle slightly developed, antennal tubercles distinct, inner margins slightly diverging (Fig. 1). Dorsal hairs of body fewer, slightly thick and sharp. Head with 1 pair of cephalic hairs, 2 pairs of antennal tubercular hairs and 6 or 7 dorsal hairs (Fig. 1). Length of cephalic hairs 0.05–0.07 mm, $1.85\times$ – $2.4\times$ as long as widest diameter of 3rd antennal segment. Antennae 6-segmented (Fig. 2), slender, 1.51–1.97 mm long, $0.88\times$ – $1.15\times$ as long as body; 3rd–6th segments with weak imbrications. Proportion of 1st–6th segments: 26:17:100:91:97:40+157; processus terminalis $3.33\times$ – $4\times$ as long as basal part. Antennal hairs short and sharp, 1st–6th segments each with 5 or 6, 4, 4–7, 2–5, 3–5, 2+0 or 1 hairs, respectively; apex of processus terminal with 2 or 3 hairs; length of hairs on 3rd antennal segment 0.02 mm, $0.63\times$ as long as widest diameter of this segment. Primary rhinaria small rounded, ciliated. Rostrum reaching mid-coxae; ultimate rostral segment wedge-shaped (Fig. 3), $1.71\times$ – $2.18\times$ as long as its basal diameter, $1.7\times$ as long as 2nd segment of hind tarsi, with 4–6 accessory hairs among them. Thorax tergum membranous. Pronotum with 2 or 3 spinal, 1 pair of pleural and 1 pair of marginal hairs; mesonotum with 2–3 pairs of spinal, 1 pair of pleural and 2 pairs of marginal hairs; metanotum with 2 pairs of spinal, 1 pair of pleural and 2 pairs of marginal hairs. Hind femur 0.59–0.71 mm long, $1.68\times$ – $2\times$ as long as 3rd antennal segment. Hind tibia 1.03–1.24 mm long, $0.6\times$ – $0.72\times$ as long as body. Hairs on legs sparse, short and sharp; length of hairs on hind tibia 0.03–0.05 mm, $0.92\times$ – $1.38\times$ as long as middle diameter of the segment. First tarsal chaetotaxy: 2, 2, 2. Mesosternal furca with two arms separated, length of single arm, 0.08–0.11 mm, $1.33\times$ – $1.83\times$ as long as 2nd antennal segment. Abdomen tergum membrane (Fig. 4); dorsal hairs on abdominal tergites sparse and sharp; 1st–5th abdominal tergites each with 3–5, 3 or 4, 2–4, 2 or 3 and 1–3 spinal hairs, respectively; 1st–4th abdominal tergites each with 2–5, 4 or 5, 3–5, and 4–6 pleural hairs, respectively; 5th tergite without pleural hairs; 1st–5th tergites each with 1 pair of marginal hairs, 6th tergite with 2 pairs of spino-pleural and 1 pair of marginal hairs; 7th tergite with 1 pair of pleural and 1 pair of marginal hairs; 8th tergite with 4 or 5 hairs. Length of marginal hairs on 1st tergite and dorsal hairs on 8th tergite 0.05–0.06 mm, 0.05–0.07 mm, $1.85\times$ – $2.22\times$ and $1.85\times$ – $2.41\times$ as long as widest diameter of 3rd antennal segment, respectively. Spiracles round and open, spiracular plates long oval,



Figures 1-7. Apterous viviparous females of *Polytrichaphis illicius*.

Figure 1. Dorsal view of head.

Figure 2. Antenna.

Figure 3. Ultimate rostral segment.

Figure 4. Dorsal view of abdomen.

Figure 5. Siphunculus.

Figure 6. Cauda.

Figure 7. Anal plate.

Figures 8-10. Alate viviparous females of *Polytrichaphis illicius*.

Figure 8. Third and fourth antennal segments.

Figure 9. Dorsal hair on abdominal tergites and hair-bearing sclerite.

Figure 10. Fore wing.

Scale bar: Figs. 1-8, 10 = 0.1 mm, Fig. 9 = 0.05 mm.

brown. Siphunculi sub-cylindrical (Fig. 5), with weakly spinulose short imbrications; 0.34-0.37 mm in length, distal diameter 0.06 mm, length $3\times$ - $4.13\times$ as long as its basal width, $2\times$ - $2.12\times$ as long as cauda, $0.2\times$ - $0.22\times$ as long as body. Cauda elongated tongue-shaped (Fig. 6), non-constricted, with spinulose short imbrications, 0.16-0.18 mm in length, $1.42\times$ - $1.6\times$ as long as its basal diameter, with 7-11 hairs. Anal plate circular at apex (Fig. 7), with spinulose short imbrications and 15-20 hairs. Genital plate with weakly spinulose transverse imbrications and 12 or 13 hairs, 4 anterior hairs among them. Gonapophyses three, each with 4 or 5 short sharp hairs.

Description of Alate Viviparous Females.—Body long elliptical, black in life, 1.43-1.88 mm long, 0.53-0.95 mm wide. In mounted specimens: Head, thorax, 1st antennal segment, apex of rostrum,

Table 1. Measurements of apterous viviparous females (mm).

No.	Body length	Body width	Hind femur	Hind tibia	Ant. III	Ant. IV	Ant. V	Ant. VI	Siphunculi	Cauda
1	1.70	1.05	0.64	1.09	0.36	0.31	0.33	0.14 + 0.52	0.35	0.16
2	1.81	1.13	0.65	1.13	0.36	0.33	0.35	0.15 + 0.58	0.36	0.18
3	1.75	1.06	0.67	1.24	0.36	0.32	0.35	0.14 + 0.59	0.34	0.16
4	1.78	1.03	0.66	1.14	0.35	0.37	0.38	0.15 + 0.59	0.37	0.16
5	1.63	0.95	0.59	1.03	0.30	0.26	0.27	0.12 + 0.41	0.35	0.16
6	1.70	0.96	0.66	1.13	0.38	0.33	0.36	0.15 + 0.56	0.36	0.18
7	1.73	0.93	0.66	1.14	0.36	0.31	0.33	0.14 + 0.55	0.36	0.18
8	1.70	1.00	0.66	1.08	0.38	0.30	0.36	0.15 + 0.57	0.36	0.16
9	1.75	1.03	0.71	1.19	0.38	0.32	0.37	0.15 + 0.60	0.36	0.18
10	1.63	0.98	0.61	1.03	0.31	0.30	0.31	0.15 + 0.54	0.34	0.16
Average	1.71	1.01	0.65	1.12	0.35	0.32	0.34	0.14 + 0.55	0.36	1.68

coxae, trochanters, basal 1/3 of siphunculi and veins dark brown, 7th–8th abdominal tergites with cross bands across the segment; others pale brown.

Frontal tubercle slightly developed, antennal tubercles distinct, inner margins slightly diverging. Head with 1 pair of cephalic hairs, 2 pairs of antennal tubercular hairs and 6 or 7 dorsal hairs; Antennae 6-segmented, 1.74–2.15 mm long, 1×–1.25× as long as body, 1st antennal segment dark brown; 3rd–6th segments with weak imbrications (Fig. 8); proportion of 1st–6th segments: 21: 18: 100: 80: 85: 34+139; processus terminalis 3.53×–4.46× as long as its basal part. Antennal hairs much short and sharp, 1st–5th segments each with 5 or 6, 4, 3–6, 2–4, 3–6 hairs, respectively; base of 6th segment with 1 or 2 hairs, processus terminalis each with 0 or 1 hair; apex of processus terminalis with 3 hairs. Length of hairs on 3rd segment 0.01–0.02 mm, 1/3×–1/2× as long as widest diameter of this segment. Secondary rhinaria rounded, variable in size, 3rd segment with 23–31 rhinaria and 4th segment with 10–19 rhinaria along their whole length, 5th segment with 0 or 1 rhinarium. Rostrum reaching mesothorax, ultimate rostral segment wedge-shaped, 0.1–0.12 mm long, 1.57×–2.2× as long as its basal width, 1.43×–1.71× as long as 2nd segment of hind tarsi, with 2–3 pairs of accessory hairs. Pronotum each with 1 pair of spinal, pleural, and marginal hairs. Hind femur 0.52–0.67 mm long, 1.27×–1.63× times as long as 3rd antennal segment. Hind tibia 0.98–1.19 mm long, 0.57×–0.69× as long as body. Hairs on legs sparse; short sharp. Length of hairs on hind tibia 0.02–0.03mm, as long as middle width of the segment. First tarsal chaetotaxy: 2, 2, 2. Fore wing 2.25–2.85mm long, 1.31×–1.66× as long as body (Fig. 10). Media vein 2-branched; hind wing with two oblique veins. Wing veins bordered with black bands. 7th–8th abdominal tergites with spinulose short imbrications. Dorsal hairs of body sparse, slightly short sharp, which on abdominal tergites with distinct hair-bearing sclerites (Fig. 9); 1st–7th abdominal tergites each with 4, 2, 2 or 3, 2 or 3, 2, 1 or 2 and 2 or 3 spinal hairs, respectively; 1st–4th tergites each with 2–4, 3–6, 4, and 5 or 6 pleural hairs, respectively, 6th tergite with 2 pleural hairs, 5th and 7th tergites without pleural hairs; 1st–7th tergites each with 1 pair of marginal hairs; 8th tergite with 4 or 5 hairs. Length of marginal hairs on abdominal 1st tergite and dorsal hairs on 8th tergite 0.03–0.05 mm, 0.05–0.06 mm, 1×–1.67× and 1.67×–2× as long as widest diameter of 3rd antennal segment, respectively. Siphunculi with weakly spinulose imbrications; 0.26–0.31 mm long, 3.16–3.76× as long as its basal diameter, 1.86×–2.21× as long as its basal width. Cauda 0.13–0.15 mm long, with spinulose short imbrications and 7–9 hairs. Anal plate with spinulose short imbrications and 16–18 hairs. Genital plate with weakly spinulose imbrications and 13 or 14 hairs, 4 anterior hairs among them. Other data same as apterous viviparous females.

Diagnosis.—The new species is near to *Polytrichaphis fragilis* Miyazaki, but differs from it as follow: basal 1/3–1/2 of siphunculi dark (the latter: dark brown in wholly length); black in life (the latter: yellow to pale yellowish green in life); 8th tergite with 4 or 5 hairs (the latter: 9–13 hairs); genital plate with 4 anterior hairs (the latter: 2); dorsal hairs on body shorter and fewer (the latter: tergum abounding with long flagellate hairs) (Miyazaki 1971).

Etymology.—The new species is named for its infesting on *Illicium verum*.

Table 2. Measurements of alate viviparous females (mm).

No.	Body length	Body width	Fore wing	Hind femur	Hind tibia	Ant. III	Ant. IV	Ant. V	Ant. VI	Siphunculi	Cauda
1	1.70	0.70	2.25	0.61	1.10	0.38	0.34	0.35	0.15 + 0.56	0.31	0.13
2	1.88	0.73	2.53	0.64	1.19	0.44	0.41	0.37	0.15 + 0.59	0.30	0.14
3	1.43	0.53	2.50	0.52	0.98	0.36	0.27	0.31	0.12 + 0.53	0.28	0.13
4	1.85	0.95	2.85	0.67	1.13	0.43	0.39	0.37	0.15 + 0.55	0.29	0.14
5	1.83	0.75	2.78	0.65	1.15	0.47	0.39	0.37	0.15 + 0.60	0.30	0.15
6	1.80	0.78	2.65	0.62	1.15	0.45	0.40	0.38	0.14 + 0.62	0.31	0.15
7	1.65	0.65	2.40	0.57	1.01	0.39	0.31	0.31	0.14 + 0.54	0.26	0.13
8	1.71	0.78	2.50	0.62	1.12	0.37	0.36	0.37	0.13 + 0.60	0.28	0.15
9	1.70	0.75	2.55	0.64	1.11	0.40	0.33	0.35	0.14 + 0.53	0.26	0.14
10	1.63	0.75	2.45	0.62	1.13	0.36	0.38	0.36	0.14 + 0.59	0.30	0.14
Average	1.72	0.74	2.55	0.62	1.11	0.41	0.33	0.35	0.14 + 0.57	0.29	1.14

ACKNOWLEDGMENT

We thank Jinyi Huang, for collecting specimens. The work is supported by a grant from National Natural Science Foundation from P. R. China (Grant No. 39700015), a grant for special fund of systematic and evolutionary biology, the Chinese Academy of Sciences to Yang Xingke, and a biological and technical innovation grant from the Chinese Academy of Sciences (Grant No. C2999084).

LITERATURE CITED

- Blackman, R. L. & V. F. Eastop. 1984. Aphids on the world's crops. An identification guide. The Pitman Press, Ltd., Bath, Avon. John Wiley & Sons, VII: 466 pp.
- Blackman, R. L. & V. F. Eastop. 1994. Aphids on the world's trees. An identification and information guide. University Press, Cambridge, Center for Agriculture and Biosciences International VIII: 1024 pp.
- Eastop, V. F. 1979. Key to the genera of the subtribe Aphidina (Homoptera). Syst. Ent., 4: 379–388.
- Heie, O. E. 1992. The Aphidoidea (Hemiptera) of Fennoscandia and Denmark. IV. Scandinavian Science Press Ltd., Denmark, Fauna Ent. Scand., 25: 1–189.
- Miyazaki, M. 1971. A revision of the tribe Macrosiphini of Japan (Homoptera: Aphididae: Aphidinae). Ins. Mats., 34: 1–247.
- Remaudière, G. & M. Remaudière. 1997. Catalogue of the world's Aphididae. Homoptera: Aphidoidea. Paris, Institut National de la Recherche Agronomique, 473 pp. (in French.)

Received 2 Sep 2000; Accepted 13 Feb 2001.